

MAY 1973



(11) C CA No. 925334

(45) ISSUED May 1, 1973

(52) CLASS 89-16
C.R. CL.

(10) **CANADIAN PATENT**

(54) **GAS OPERATED TOGGLE ACTION WEAPON**

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(21) APPLICATION No. 123,671
(22) FILED Sep. 24, 1971

(30) **PRIORITY DATE**

No. OF CLAIMS 8

925334

GAS OPERATED TOGGLE ACTION WEAPON

Background of the Invention

This invention pertains to toggle action weapons, and is particularly directed to a gas operated toggle action pistol in which the toggle recedes into the handle to offset the effect of firing recoil.

Heretofore, the majority of all toggle actuated weapons of this class have been recoil operated, thus lending their complexity to a degree of inefficiency that was not acceptable to the public or to the military market. Further, 10 all prior small hand-held weapons, pistols, revolvers and submachine guns have been limited to the use of small, low energy pistol ammunition, and were limited as to size, weight, chamber pressure and velocity of the projectile.

Summary of the Invention

One of the objects of this invention is to provide a gas operated weapon which is very light in weight.

Another object is to provide a weapon having a positive locking breech capable of withstanding any and all chamber pressures.

20 Another object is to provide a hand held pistol capable of firing rifle cartridges with safety.

It is also an object to provide a weapon made almost entirely from castings.

A further object is to construct such a gun as above recited with a small number of parts.

And another object is to construct such a weapon of simple design that is virtually completely free of any malfunction or breaking of parts.

It is further an object to provide a weapon having a member hinged at the rear of the receiver, with a pin parallel to the center of the gun, allowing the gun to open its full length like a clam shell, so the barrel can be changed instantly.

Another object is to provide a weapon using one basic receiver and one basic clip so that a plurality of calibers can be fired from the same weapon, by merely exchanging barrels.

10 It is also an object to provide a weapon with a toggle design such that there is only one point of contact in the moving parts going rearward and one point of contact in the moving parts returning to their original position, so as to make the operation of the gun completely silent.

 A further object is to provide a weapon having a gas operated toggle which allows the breech pressure at the time of opening to be controlled so as to do away with any residual pressure making a secondary explosion at the time the breech opens, the result making it possible to control
20 the pressure in such a way that any amount of pressure desired can be present when the weapon opens and also provides zero pressure when the breech opens.

 Another object is to provide a toggle for a weapon that is dynamically balanced so as to accomplish a smooth, consistent, and continuous pressure throughout the movement of the bolt in which the line of force from the moving parts is directed to the palm of the hand and not above as in prior automatics, resulting in a tremendously effective means of controlling the weapon when held in one hand, virtually
30 eliminating all noticeable recoil.

Another object is to provide a weapon with a gas operated piston that can be adjusted so that the pressure and motion of the piston and toggle actuating wedge can fully operate the entire firing cycle of the weapon, thus making it truly gas operated.

Brief Description of the Drawings

Fig. 1 is a right hand side elevation of a gas operated toggle action weapon incorporating the features of this invention.

10 Fig. 2 is a top plan view of the weapon in Fig. 1.

Fig. 3 is a rear end fragmentary view of the weapon shown in Figs. 1 and 2.

Fig. 4 is an enlarged fragmentary sectional view on the line 4-4 of Fig. 5.

Fig. 5 is an enlarged fragmentary sectional view on the line 5-5 of Figs. 1 and 4.

Fig. 6 is an enlarged fragmentary sectional view on the line 6-6 of Fig. 4.

20 Fig. 7 is an enlarged cross-sectional view on the line 7-7 of Fig. 5.

Fig. 8 is an enlarged cross-sectional view on the line 8-8 of Fig. 5.

Fig. 9 is an enlarged cross-sectional view on the line 9-9 of Fig. 6.

Description of the Preferred Embodiment

As an example of one embodiment of this invention, there is shown a pistol having a frame 10, and a handle 11, a trigger 12 with trigger guard 13, and bullet magazine 14. A demountable barrel 15 has a rear end diameter portion 16

having a radially disposed flange 17 which is received in the semi-circular bore 18 and groove 19 in the front end of the frame 10. An elongated clamp 20 which is pivotally mounted on a suitable hinge screw 21 is secured in the frame 16 so that the clamp 20 can swing between the full line position shown in Figs. 2 and 4 to the broken line position 20a. The outer end of the clamp 20 is provided with a mating semi-circular bore 22 and groove 23 to match bore 18 and groove 19 to grip the diameter portion 16 and flange 17 to secure the gun barrel 15 in firing position on the frame 10. A suitable locating pin 24 carried in the clamp 20 in the groove 19 enters the notch 25 in the flange 17 to rotatably orient and secure the barrel 15 against rotation on the frame 10. The clamp is secured in closed position by suitable screws 25a in the frame 10.

The bullet magazine 14 is demountably secured by the usual releasable latch 26 in the guide sleeve 27 of the frame 10 to feed the bullets 28 into insertion and firing position by the usual bolt 29 which moves on the guide keys 30 in appropriate guide slots 31 and 32 in the frame 10 and clamp 20 longitudinally of the breech opening 33 of the rear end of the barrel 15. The rear end of the bolt 29 is pivotally connected by a pivot pin 34 carried in the front end of the front link 35, the rear end of which is pivotally connected by a pivot pin 36 to the front end of the rear link 37, in turn pivotally connected by a pivot pin 38 carried in the rear portion of the frame 10 to thus provide a toggle 35-37 for controlling the movement of the bolt 29.

Normally, when the bullet 28 has been loaded in the barrel in firing position, the toggle 35-37 is aligned, as shown in full line in Fig. 5, with the top surface 37a

up against the locating abutment surface 39 of the frame 10 at which time the axis 40 is slightly above a line 36a between the axes 41 and 42 of pins 34 and 38 so that the toggle 35-37 is in an over-center locked position as shown in full line in Fig. 5. A compression spring 44 is carried on a push rod 45 slidably supported in a clearance hole 46 in a baffle 47 in the handle 11 and pivotally connected by a pin 48 to the link 37, the compression spring 44 operating between the baffle 47 and a flange 49 of the push rod 45 to normally yieldingly hold the toggle 35-37 in over-center locked firing position of the gun.

The toggle 35-37 is tripped from over-center locked position by gas pressure from the gunbarrel when the gun is fired. One preferred example of such mechanism may comprise an actuating cam 50 connected to a piston rod 51 slidably mounted in an elongated cylinder bore 52 formed in the clamp 20, which bore 52 in turn is in communication through a port 53 in the clamp 20 and an aligned port 54 in the gun barrel 15. A tension spring 55 connected between an anchor pin 56 in the frame 10 and the actuating cam 50 normally yieldingly holds the piston rod 51 and actuating cam 50 in retracted position as shown in full line in Fig. 6. When the cam 50 moves rearwardly from gas pressure from the gun barrel in cylinder bore 52, the sloping cam surface 57 engages the pin 36, Fig. 4, to push the pin downwardly below the line 36a to break dead center for the toggle 35-37.

At the time this happens, the bullet 28 has left the barrel 15 and is on its way to its target. The force still remaining in the inertia of the piston rod 51 and the cam 50 plus the residual pressure still existing in the

chamber 58 continues to drive the piston rod 51 and bolt 29 with sufficient force to complete the travel of the piston rod, activating the cam to its rearmost travel position 50a against stop pin 50b sufficient to move the center pin 36 and force it to complete its downward travel along the arcuate path 59 to its lowest point 60 down inside the handle 11 of the gun, compressing spring 44.

10 The inertia of the bolt 29 continues rearwardly, compressing the recoil compression spring 61 acting between the lug 62 of the bolt 29 and the frame 10 of the gun until the lug 62 engages the stop surface 63 of the frame. At that time, spring 55 returns the piston 51 and cam 50 forwardly to retracted position shown in full line in Fig. 6. The bolt 29 and toggle 35-37 are returned to their original positions by the stored-up energy in the two springs 44 and 61. This completes the firing cycle and prepares the gun for the second firing, having picked up an additional bullet 28 from the clip magazine and placed it in the chamber when the bolt returned to its original position by well known
20 conventional mechanism.

Having now particularly described and ascertained the nature of my said invention and the manner in which it is to be performed, I declare that what I claim is:

1. A gas operated toggle action pistol comprising:
a frame,
a handle on the frame,
a barrel having a firing chamber,
a bolt movable in the frame axially to and from the firing chamber of the gun barrel, and
a toggle interconnected between the bolt and the frame,

said toggle comprising a pair of pivotally connected links, the free end of one of said links being pivotally connected to said bolt and the free end of the other of said links being pivotally connected to said frame, said toggle being movable to an over-center locked position slightly above a line between the pivotal connection of the toggle on the bolt and on the frame.

2. A gas operated toggle action pistol as in claim 1 wherein the pivotal interconnection of said links of the toggle swings downwardly within the handle of the gun.

3. A gas operated toggle action pistol as in claim 1 wherein a compression element is provided within the handle interconnected between the frame and the toggle to normally yieldingly urge the toggle to upward over-center locked position.

4. A gas operated toggle action pistol as in claim 1 wherein a gas operated actuating device movable on

the frame is arranged to actuate and release the toggle from over-center locked position from gas pressure developed in the barrel by firing the gun.

5. A gas operated toggle action pistol as in claim 1 wherein a gas operated mechanism for tripping the toggle from over-center locked position comprises a cylinder bore in the frame in communication with the gun barrel bore, a piston rod reciprocable in the cylinder bore having cam means to engage an intermediate point of the toggle.

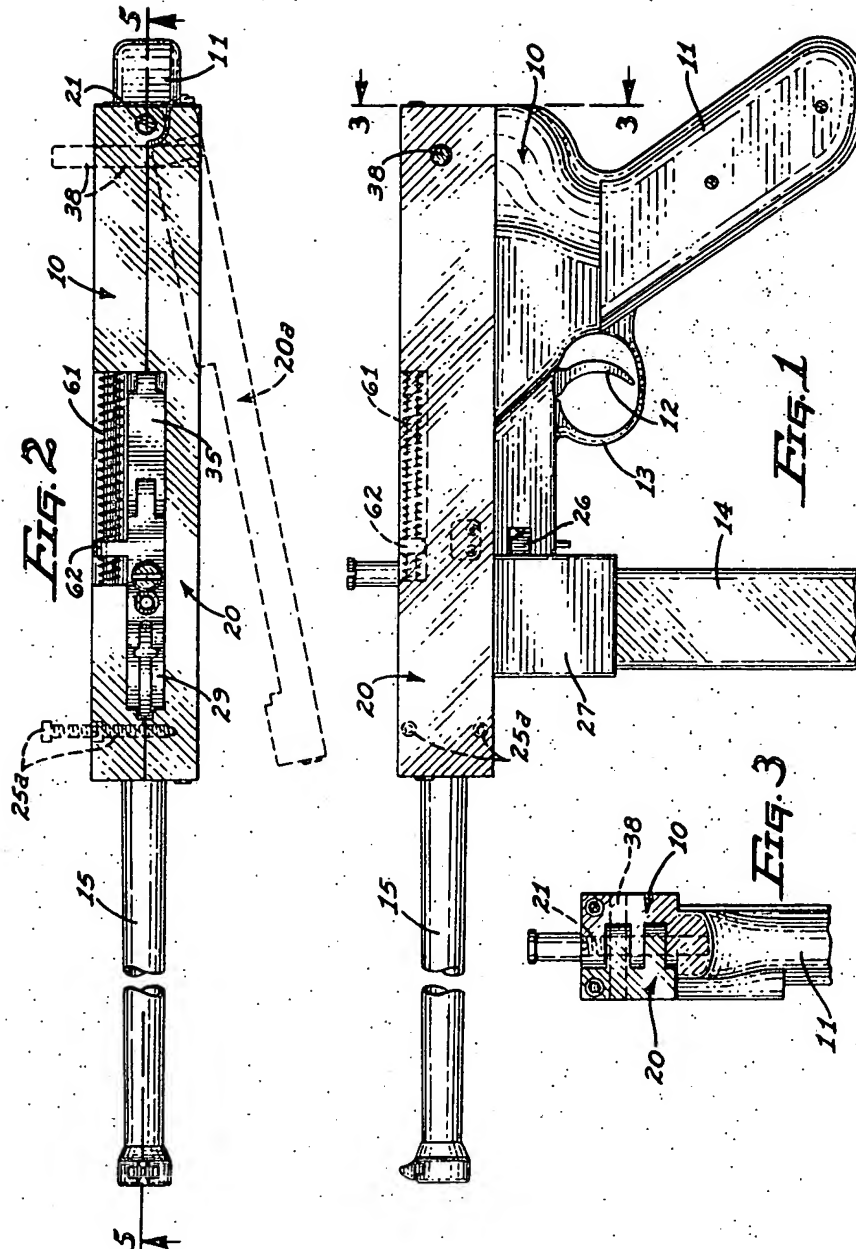
6. A gas operated toggle action pistol as in claim 1 wherein the frame comprises a swinging clamp at one side of the frame and pivoted to swing about a vertical hinge at the rear of the frame to permit assembly and service of the gas operated toggle action piston.

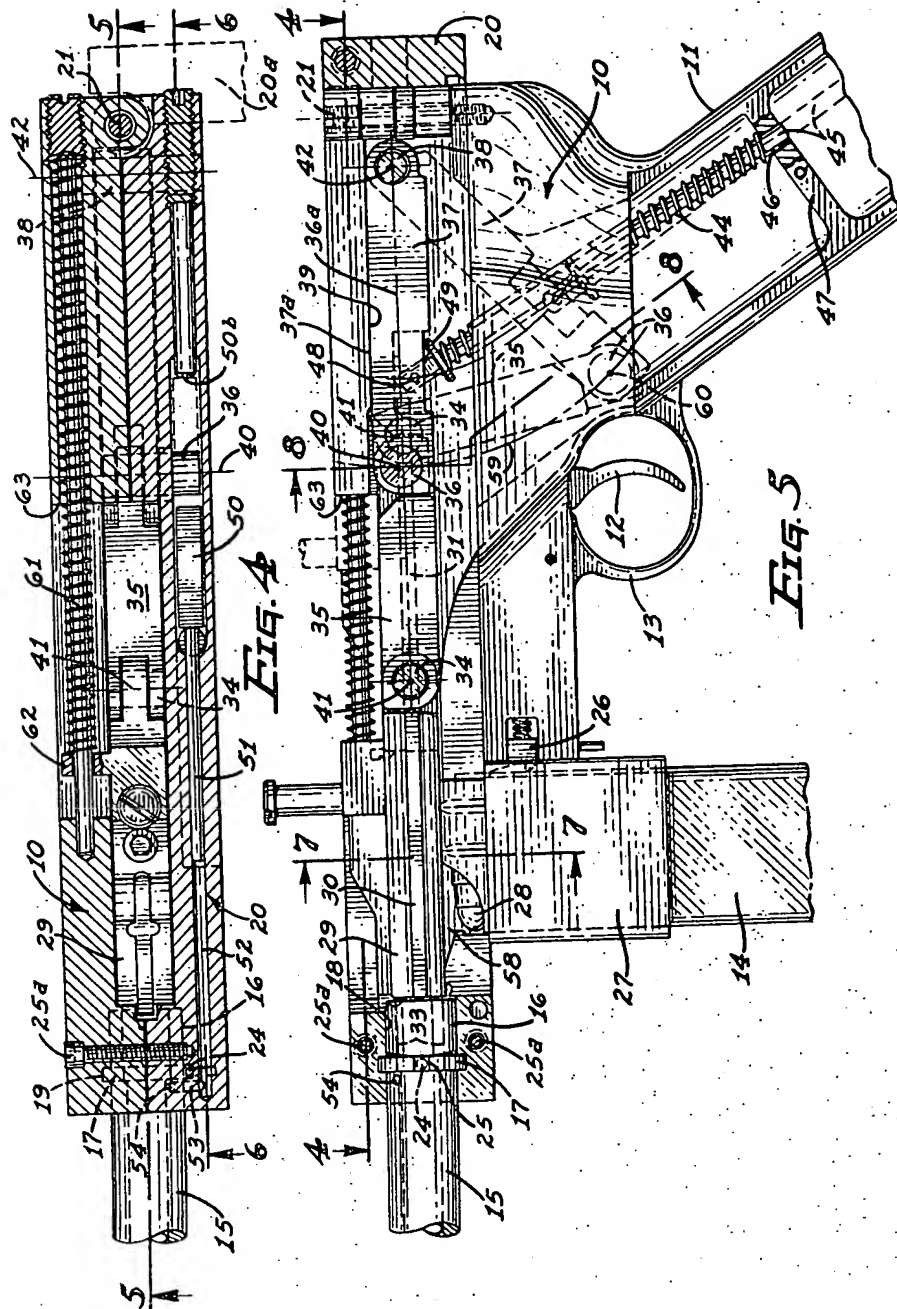
7. A gas operated toggle action pistol as in claim 1 in further combination with means for demountably securing said barrel at its rear end to the frame, said means comprising a clamp forming one side of the frame which is pivotally mounted on the frame to swing about a vertical axis at the rear of the frame to allow rapid replacement of barrels in the frame.

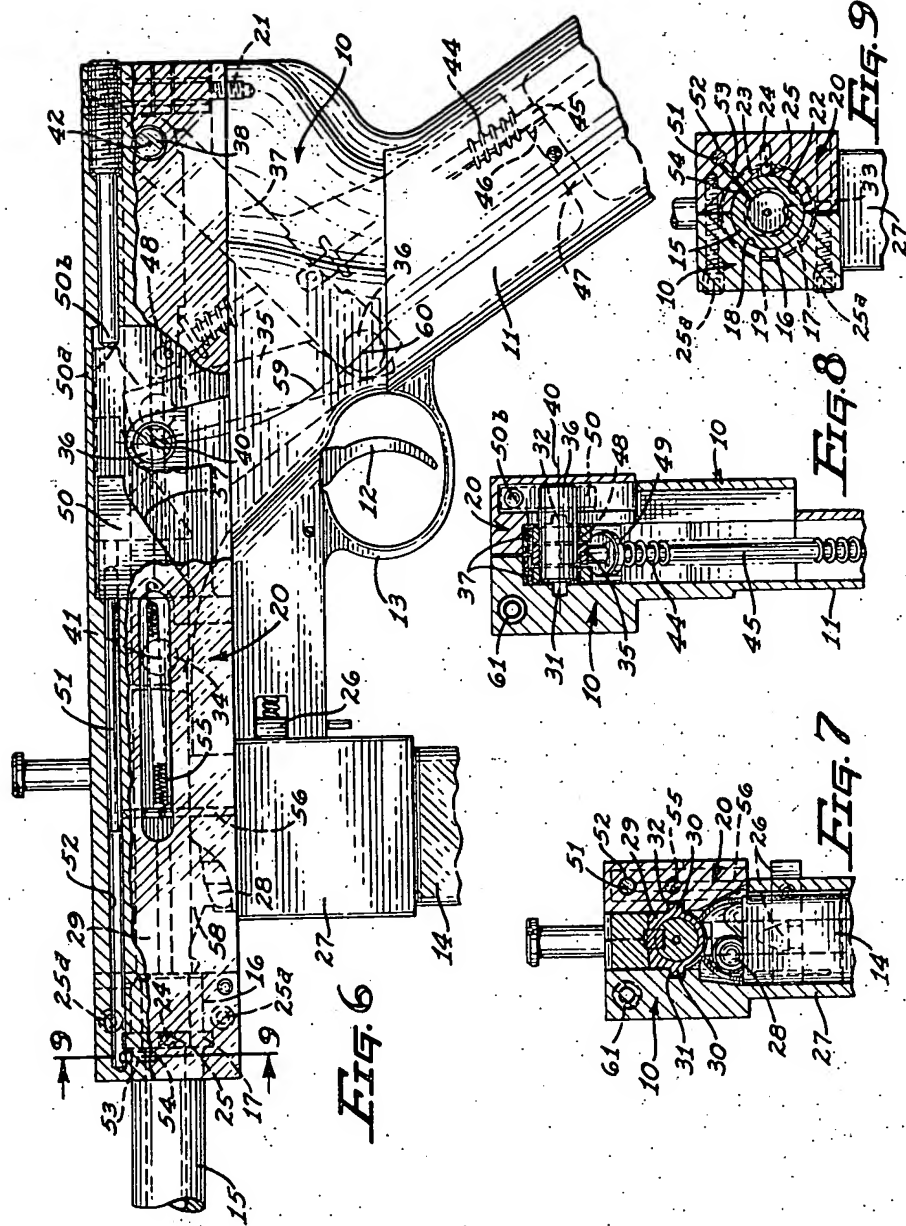
8. The gas operated toggle action pistol as in claim 1 wherein gas under pressure in the barrel releases the toggle from its over-center position.

925334

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